APPENDIX B

LOOKING WITH A PURPOSE — FINDING INVASIVE SPECIES IS THE FIRST STEP IN MANAGING NEW INTRODUCTIONS AND ESTABLISHING POPULATIONS.

DETECTION

discussion date: November 17, 2011

Detection is the process of finding invasive species and sharing that information. Monitoring for range expansions and gauging the effect of control efforts are both part of looking for species not known to be present and delimiting the range of widely established species. The value in considering both monitoring and early detection together under the broader term detection is that they have some level of overlap. Recording the known locations of invasive species, recording past control efforts, and being able to share that information with stakeholders and future resource stewards is critical to successful invasive species management.

Early detection has been recognized as a key step of invasive species management strategies that include a rapid response to new species discoveries. The most commonly understood response to an early detection includes some form of chemical or mechanical control resulting in eradication. Because eradication responses are most likely to succeed when the established population is small, finding populations very early has justified the cost and effort required to find very low numbers of a target species. The success of this strategy has been well documented for terrestrial plants. However, this is not the only reason to focus on detection as an element of invasive species control. An important consideration in deciding on the level of effort to invest in early detection is what the response to a successful detection will be and how dependent the results of the response are on the length of time that has gone by since the population was established.

When the search for newly establishing populations includes looking for regionally established invasive species, the term "early detection" can be appropriate locally but has more in common with monitoring when viewed on a larger scale. What scale should the term early detection be used for? It depends on the management goals at the local level. Just because a species is already widespread in the Great Lakes or along roadsides in Illinois does not mean that detection efforts do not provide value for managers protecting inland lakes or native prairies in southern Wisconsin. Local control and management effectiveness may benefit from addressing new populations of an invasive species when small even if recolonization is likely.

To better understand the current level of detection effort across Wisconsin, each of the speakers invited to present their work to the Wisconsin Invasive Species Council was asked to answer two questions. These were:

- *What are you doing related to early detection?*
- *What are the costs and value created by your early detection work?*

Summaries of their presentations and a discussion of gaps identified during the post-presentation discussion with the Council follow.

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CASE STUDY: Great Lakes Indian Fish & Wildlife Commission (GLIFWC)

Miles Falck, *Great Lakes Indian Fish & Wildlife Commission*

GLIFWC supports both field biologists and the development of a shared database for priority invasive species across the Great Lakes region. These biologists are conducting terrestrial and aquatic surveys in northern Wisconsin and in the Western Upper Peninsula of Michigan for all taxa but with an emphasis on plants. This survey data is compiled and shared via gisin.glifwc.org. This data and other information are used to model the potential distribution of invasive terrestrial plants to assess risk and determine the management priority of new populations.

The program has an annual budget of about $100,000 for terrestrial and aquatic invasive plant surveys. This effort provides a level of confidence in assessing the relative abundance and distribution of several hundred invasive species in northern Wisconsin and western Michigan, and therefore the appropriate level of resources to devote to education, prevention, control, and research.

CASE STUDY: United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA APHIS)

JoAnn Cruse, *USDA, Animal and Plant Health Inspection Service*

APHIS provides some level of pest detection funding to cooperators as well as funding for Plant Protection and Quarantine (PPQ) staff within Wisconsin. Surveys are focused upon gypsy moth, emerald ash borer, potato cyst nematodes, khapra beetle, leek moth, exotic wood borers, bark beetles, and other pests potentially introduced through importations.

Statewide, just over $2,000,000 is issued to cooperators and roughly $400,000 is used by PPQ to conduct work associated with pest detection efforts. Some of these surveys allow Wisconsin and the US to export agricultural products based upon freedom of pests in geographic areas. Some surveys allow us to make decisions to quarantine areas to prevent the further spread of domestic exotic pests and to determine areas in which treatment to control the pest is possible and efficacious.

CASE STUDY: Citizen Lake Monitoring Network — A statewide model for detection

Laura Herman, *University of Wisconsin Extension — Lakes*

The project began in 1986 with 126 Citizen Lake Monitoring Network (CLMN) volunteers collecting secchi (water clarity) data on 113 lakes. The first expansion of the project was in 1990 when a pilot expansion included data on phosphorus, chlorophyll, temperature, and dissolved oxygen. As these other measurements were going well, aquatic invasive species monitoring was added in as a statewide effort in 2006. By 2009, the data could be added online increasing access to this information and decreasing the time between discovery of new species and reporting. A core part of the program is the effort that goes into training and supporting volunteers with a variety of levels of training for a range of participants from casual observers to trained monitors. Volunteers receive a kit with identification resources and collection tools. A manual has been developed for aquatic invasive species that has chapters for 10 species and more can be developed and added.

Costs are the dedicated staff that provide training, support for the database work, and minimal supplies and support to cover sample processing. This is highly leveraged with many volunteer hours and resources. The data provided by volunteers has resulted in new finds of target invasive species and in tracking the success or failure of control efforts. Each volunteer conducts sampling and enters their data directly into DNR's data base, the Surface Water Integrated Monitoring System (SWIMS).

CASE STUDY: Department of Agriculture, Trade and Consumer Protection (DATCP)

Clarissa Hammond, *Department of Agriculture, Trade and Consumer Protection*

Projects at DATCP include detection and trapping for gypsy moth and emerald ash borer; nursery inspections for pests, diseases, and invasive plants; Christmas tree inspections; the apiary program focused on bee pests and Africanized honey bees; and pest surveys for a variety of pests and diseases of crops, woodlands, and pastures.

Surveillance and detection activities enable the export of crops and commodities from Wisconsin. Last year $306,453,450 in products were exported from the state to 60 destination countries. The Phytosanitary Certification Program issued over 8,000 certificates verifying pest-free status of Wisconsin exports. The value of Wisconsin crop production in 2009 was estimated at more than $3 billion. Corn and soybean production was valued at more than $1.5 billion (Wisconsin 2010 Agricultural Statistics Report). Wisconsin ranks #1 in the nation for production of corn for silage, oats, cranberries and snap beans for processing. Crops with 2nd and 3rd ranks include: forage, potatoes, carrots (processing), sweet corn (processing), and green beans (processing). Excluding silage corn, these products are valued at more than $800 million (Wisconsin 2010 Agricultural Statistics Report).

Survey activities also serve as an opportunity for public outreach. Plant Industry Bureau staff interact with nursery growers, nursery dealers, farmers, beekeepers, seed company representatives, homeowners, local government representatives, and various others on a regular basis. During these interactions, staff will provide information on the various pests of concern. This helps to increase the network of people looking for exotic plant pests. Early detection work affords communities the ability to budget for response measures over longer periods of time and decreases the overall costs associated with control. For example, some communities infested with emerald ash borer (EAB) in Michigan were forced to spend money on hazardous tree removal instead of

continued

purchasing equipment such as fire trucks. If EAB had been detected earlier, these initial costs would not have been as great. Annual costs associated with wood boring insects include local government expenditures, such as tree removal, replacement and treatment, totaling approximately $1.7 billion and residential property value loss totaling an estimated $830 million (Aukema et al. 2011). These costs can be decreased dramatically by early detection.

CASE STUDY: Wisconsin Department of Natural Resources (DNR)

Courtney Ripp & Scott Van Egeren, *Wisconsin Department of Natural Resources*

Projects at DNR include education on NR 40 species, specifically Prohibited, split-listed Prohibited species, and some Restricted species to encourage reporting. Partnerships are encouraged to participate in reporting regulated species, and the Invasive Plant Association of Wisconsin and regional groups such as the Midwest Invasive Plant Network have been important in identifying new populations of invasive species. Several DNR divisions, including fisheries and wildlife have field staff who conduct monitoring and population assessment work that may from time to time uncover an invasive species.

The aquatic invasive species (AIS) team is coordinating a statewide effort to monitor 150-200 lakes (with boat ramps) each year for at least the next five years. The rapid assessment surveys will include searches for aquatic invasive plants, snails, mussels, and water fleas. The team supports local and regional efforts in Wisconsin to strategically track AIS movement. By providing training to DNR Watershed stream biologists to identify and report AIS species while they are conducting stream fish, habitat, and macroinvertebrate surveys, a larger area of the state is covered. To include local partners in the effort to increase detection coverage across Wisconsin the team facilitates aquatic and wetland invasive species reporting from various groups (volunteer monitoring groups, DNR bureaus, federal agencies, GLIFWC, universities, etc.) into the SWIMS database.

The costs of the DNR led AIS lake surveys amounted to approximately 3900 hours of fieldwork this summer. Data to calculate supplies, vehicle, lodging, and lab analysis costs is not yet available.

Being able to show the rate of spread at a statewide level will allow the AIS program to evaluate education and outreach strategies which are primarily focused on transient boaters. The knowledge of where invasives exist and do not exist will help to plan local, regional, and statewide prevention and containment strategies. The financial value largely comes in reduced treatment costs for invasive aquatic plants if they are caught early in the invasion trajectory.

The costs to stream biologists of collecting presence/absence data on AIS are minimal. The biologists have been trained to watch for and report a list of species as they walk back downstream following routine fieldwork. For some species such as fish and macroinvertebrates, this data is already collected as part of their routine baseline data. The AIS identification training was not a large cost for stream biologists as it was added on to existing DNR training opportunities that captured the vast majority of stream biologists statewide. Staff time to prepare and lead the identification training was approximately 80 hours.

Similar to AIS lake monitoring, this project will again allow collection of data on distribution of AIS, an evaluation of the rate of spread of AIS in watersheds and river corridors, planning of prevention and containment strategies, and reduction in control costs. The cost of developing standard forms and reporting procedures to collect aquatic and wetland invasive species data into the SWIMS database is part of the workload for two permanent DNR staff, one GLRI funded staff position and a limited term employee. Several other staff at DNR, UW-Extension, and universities have been involved in verification of invasive species specimens. The amount of time spent on database and specimen verification has not yet been calculated.

CASE STUDY: River Alliance Project RED (Riverine Early Detection)

Laura MacFarland, *River Alliance*

The River Alliance of Wisconsin (and the DNR thanks to GLRI support) through the existing volunteer early detection program, Project RED, partner with local groups such as Valley Stewardship Network, Central Wisconsin Trout Unlimited, and Friends of the Mukwonago River, to monitor for 16 invasive species in riparian corridors by paddling, wading, or conducting driving bridge surveys. Volunteers report their data to the DNR SWIMS database. The River Alliance is also partnering with the DNR to train their Water Quality stream biologists to be able to identify and report invasive species. It is yet to be determined how we engage the Fisheries staff.

Costs associated with Project RED include staff salary, travel expenses, and materials for trainings and monitoring events. Value created includes increased number of individuals (professional and non-professional) on the lookout for new invaders. Volunteers also are contributing to the baseline data regarding the distribution of existing invasives.

CASE STUDY: Aquatic Invasive Species Coordinators and Partnership

Diane Schauer, *Aquatic Invasive Species Coordinator, Calumet County*

There is a statewide network of aquatic invasive species (AIS) coordinators who are funded by the DNR AIS grant program. These county level staff provide a contact for lake associations carrying out control and prevention efforts, local nurseries selling aquatic plants, and community education resources. The ability to interact with businesses each year can allow timely education when regulated species are discovered in trade. Many of these staff also help with detecting and controlling other invasive species on the landscape and mobilize local efforts to conduct surveys to direct control efforts.

The AIS grant program provided $228, 300 in Early Detection and Rapid Response grants in 2011 and $245,927 in 2012. Overall, the AIS Partnership grant program supported local programs with almost $4 million dollars. Value created includes increased local effort to detect, contain and control aquatic invasive species on the landscape and work with local businesses to remove invasive species from sale.

CASE STUDY: Southeastern Wisconsin Invasive Species Consortium (SEWISC)

Jim Reinartz, *University of Wisconsin – Milwaukee*

Multi-county cooperative weed management areas across Wisconsin are working to address invasive species across borders. An example of a cooperative detection project was the roadside survey that the Southeastern Wisconsin Invasive Species Consortium (SEWISC) accomplished by mobilizing 136 volunteers to search for Japanese knotweed (*Polygonum cuspidatum*), common reed grass (*Phragmites australis*), cut-leaved teasel (*Dipsacus laciniatus*), and common teasel (*Dipsacus fullonum*). These species were selected as they are common but not widespread across this region.

The next major effort by SEWISC will be to initiate a control plan targeting the small populations and isolated populations of the target weeds for control. Starting an effective regional control program depends on having data on the distribution of invasive species in advance. The cost of this work is minimal; one coordinator organized the teams that conducted the survey work but having this one dedicated person was pivotal to leveraging the volunteer effort.

RESEARCH: The Great Lakes Early Detection Network

Mark Renz, *University of Wisconsin Extension at Madison*

Early detection followed up by rapid response is accepted as the best practice for controlling and when possible, eradicating new invasions. This is currently not an effective option in the region due to inadequate financial resources, lack of management across jurisdictional boundaries, and a lack of knowledge about current distributions. There are a number of volunteer, paid, and government funded data projects across the US but currently there is no way to combine existing and incomplete data to develop a better picture of the distribution of these species. The goal of the Great Lakes Early Detection Network (GLEDN) is to facilitate sharing data across existing data projects and to increase the amount of data submitted by casual observers and citizen scientists in the Great Lakes region. This effort is being designed to be compatible with the Global Invasive Species Information Network protocols. Our knowledge of species distributions is improving as data is combined across providers.

Costs to develop this project have been minimal but required a dedicated staff with expertise in databases. The value is that successful management depends on high quality data on species occurrences and this is currently not locally available.

POLICY AND PLANNING: A cautionary note about early detection and effort prioritization based on a fisheries perspective.

Bill Horns, *Fisheries Management,*
Wisconsin Department of Natural Resources

Early detection of invasive species is helpful if it leads to effective management actions. But early detection programs can be expensive and responses to real or presumed early detections can, sometimes, be expensive, harmful, and/or futile. So it is important to outline clearly what the purpose of any proposed early detection program is and what management actions are expected in response to ostensible early detections. This will differ from one species group to another, so the practicality and wisdom of an early detection program may differ from one group to another.

I use the term "ostensible" because we can be fooled. For example, we may detect the species of interest long after it is established and only think we found it early. Maybe the goal should be "timely detection," meaning "detection at a time when helpful management responses are possible." For some species timely detection would require discovery of the first arrivals. For other species, effective control may be possible even long after the first invasion. This was the case for sea lamprey and alewives in the Great Lakes.

For several years the idea of "early detection and rapid response" or "early detection and eradication" has been advanced with application to invasive species discharged into the Great Lakes from ships ballast. I believe that it can be shown that the probability of detecting a new species that is both controllable and problematic is extremely small, and that almost all ostensible early detections will be species that are not controllable or not problematic. The program would be expensive, damaging (because control measures would affect other species), and futile.

That is not to say that a program of "timely detection and effective response" could not be launched for some species groups or individual species.

In thinking about whether, for any species group, a program of "timely detection" has merit, we also have to consider the alternative uses of the available resources. This is really a reflection on my experience with strategic planning efforts. Too often these efforts fail to prioritize activities and effectively guide the allocation of limited resources. In the case of invasive species a correct and widely held view is that investment in prevention is far more useful than investment in control.

GAPS

During the discussion with the Wisconsin Invasive Species Council, the speakers identified a number of ways that detection should be improved in Wisconsin and regionally. Those gaps fell broadly into the categories of sharing and collecting information on invasive species locations, increasing detection capacity, and targeting detection efforts.

Sharing and collecting information

The basis for collaborating on invasive species control is sharing information. The lack of a platform to enter, access, and share data across different groups of species and between agencies will continue to hobble other efforts to collaborate effectively. The level of access to taxonomic resources to identify species is acceptable but the ability of the partners to allocate resources to search for new populations of invasive species is inadequate and the lack of a simple platform to report new finds is an obvious place to start.

If it is easier to report new species, verify that they are a target species, and have that information available to encourage feedback to the reporter then participation should increase. A priority should include implementing GISIN (Global Invasive Species Information Network — see gisin.glifwc.org) which would also leverage existing information. This technology enables searching across multiple databases simultaneously to gather information on the abundance and distribution of invasive species.

Detection capacity

Agencies tasked with having staff available to search for newly establishing species need more staff on the ground. This includes supporting both state and federal agencies including APHIS. Funding for federal agencies including allocations from Congress or through the Farm Bills have continued to decrease which negatively impacts pass-through funds to cooperators.

Increased detection by other resource managers not solely tasked with invasive species work is needed to fill the growing gap. Within the Wisconsin DNR, DATCP, and other agencies there are professional resource managers (biologist, agriculturists, etc.) who are neither trained nor directed to report early detection species if they should find them in their day to day routine. For example, in 2010 DNR Watershed stream biologists were asked if they were confident that they could identify invasive species, such as Japanese knotweed, didymo, or Japanese hops in the field. The majority said that they would not be. Since then, the DNR and River Alliance partnered to train 30 staff biologists on how to identify and report 16 invasive species of concern.

Beyond providing a platform for encouraging reporting, building and sustaining volunteer networks will benefit from working with successful programs such as the Citizen Lake Monitoring Network to increase participation and volunteer retention. Citizen education and awareness is critical to early detection of aquatic invasive species in lakes, streams, and wetlands. Those who live on or near the resource will be the first people to notice something new show up on or adjacent to their property. This model should be systematically expanded to include terrestrial species including the development of a statewide "First Detector" program for new pests and diseases.

continued

Targeted efforts

Early detection monitoring by agency staff should be as strategic as possible using the best source population data, vector dispersal, and habitat suitability models available. If information on current distribution and habitat suitability is lacking, work should focus on gathering this information first. Surveillance should take place where certain organisms are likely to be introduced (based on current distribution and dispersal vectors) and become established (based on habitat suitability information).

Wisconsin Invasive Species Council: http://invasivespecies.wi.gov
Wisconsin Department of Natural Resources: http://dnr.wi.gov keyword: "invasive"

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